



KING ABDULAZIZ UNIVERSITY  
FACULTY OF COMPUTING AND INFORMATION TECHNOLOGY  
IS-Department

CPIS-483

Assignment #1

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**Submitted to:** Dr. Ghada Amoudi.

## Zachary's karate club

### Description

A social network of a karate club was studied by Wayne W. Zachary for a period of three years. This network represents a friendship between members of a university-based karate club. The club was observed for over a period from 1970 to 1972. Two individuals in the network are considered to be friends if the two individuals consistently were observed to interact outside the normal activities of the club (karate classes and club meetings). That is, an edge exists if the individuals could be said to be friends outside the club activities.

### Attributes

This friendship network consists of 34 individuals. Although club membership was near 60 at the time of observation, none of the 26 members represented interacted with other club members outside the context of meetings and classes and also, documenting pairwise links between members who interacted outside the club.

### Collection

The karate club was observed by W.W. Zachary. In addition to direct observation, the history of the club prior to the period of the study was reconstructed through informants and club records in the university archives. During the period of observation, the club maintained between 50 and 100 members, and its activities included social affairs (parties, dances, banquets, etc.) as well as regularly scheduled karate lessons.

At the beginning of the study, there was an incipient conflict between the club president and karate instructor over the price of karate lessons. As time passed, the entire club became divided over this issue.

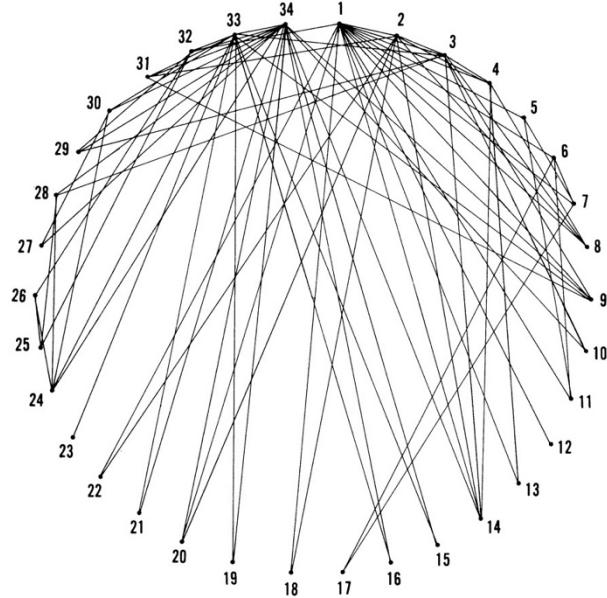


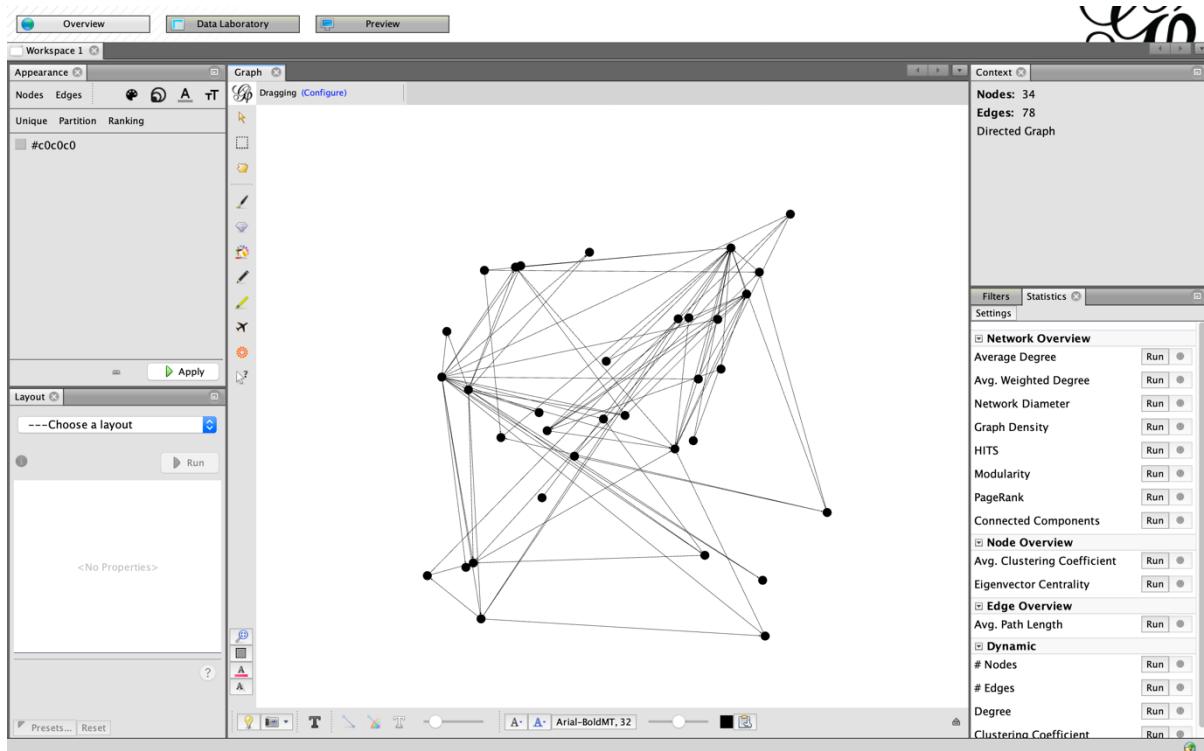
Figure 1: Social Network Model of Relationships in the Karate Club.

This is the graphic representation of the social relationships among the 34 individuals in the karate club. In this visualization, nodes 1 and 34 are Mr. Hi and John (pseudonyms) A respectively. It clearly shows that nodes 1 and 34 are the most connected of the network. However, because of how dense the relationships are for Mr. Hi and John A, the upper half of the visualization becomes difficult to read.

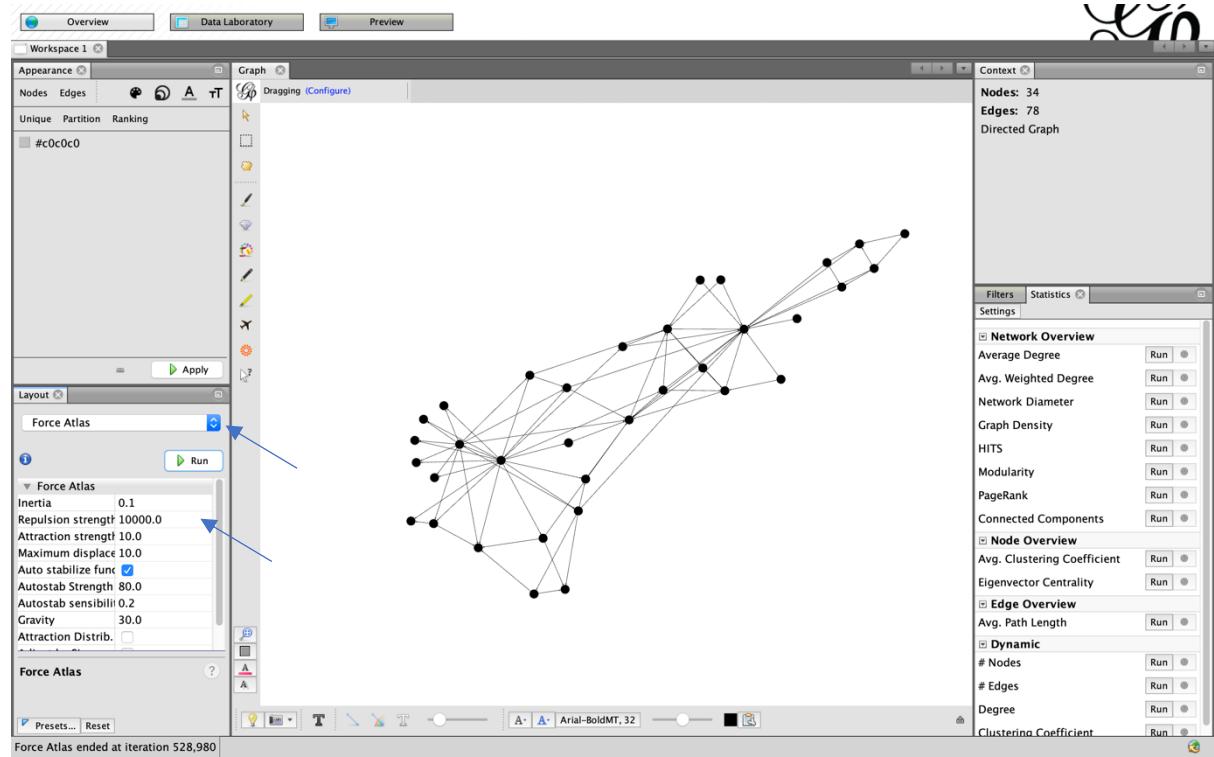
## Social network analysis tool ([Gephi](#))

#of nodes = 34	<b># of Nodes:</b>	<b>34</b>
#of edges =78	<b># of Edges:</b>	<b>78</b>
	<b>Dynamic Graph:</b>	no
	<b>Dynamic Attributes:</b>	no
	<b>Multi Graph:</b>	no

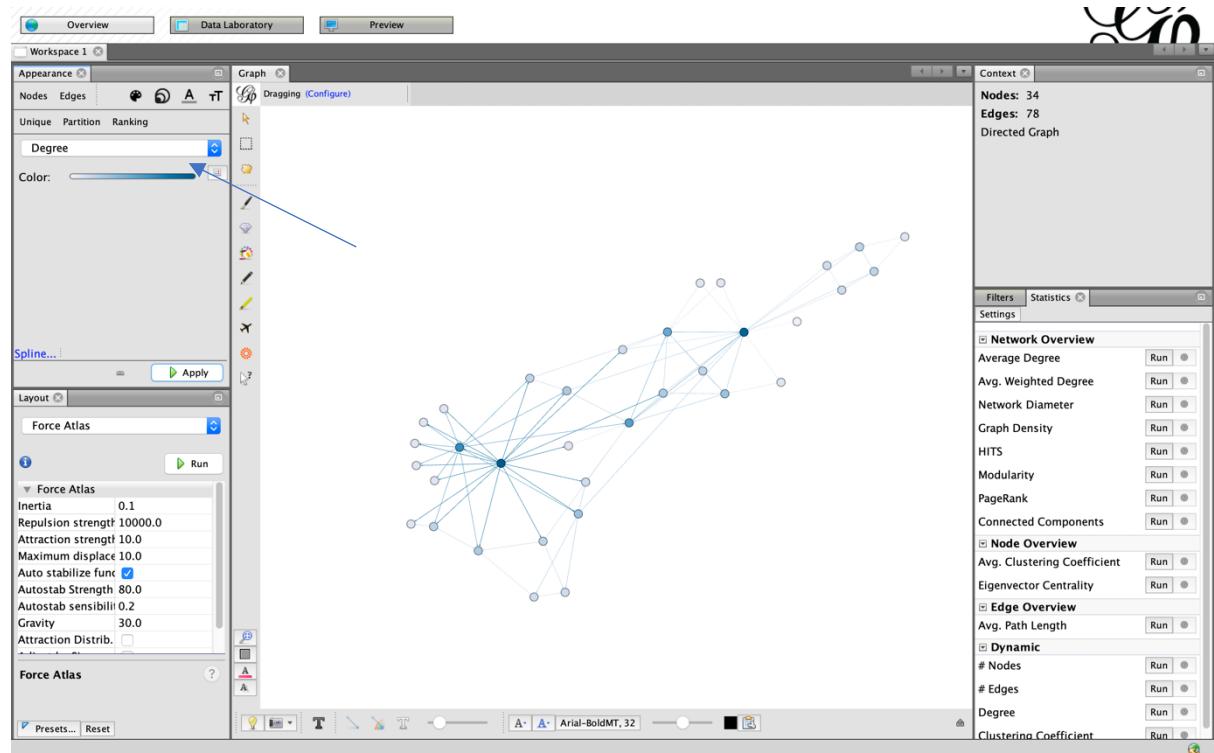
The graph for Zachary karate club:



## Changing in the Layout of the graph:



## Changing in the Ranking (Color) of the graph:



## The Average Path Length of the graph:

### **Parameters:**

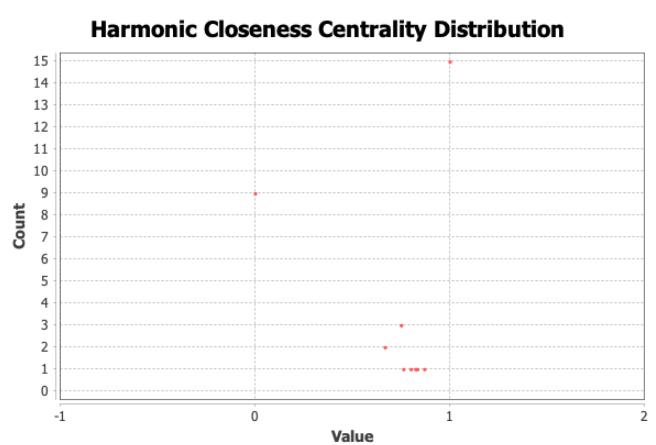
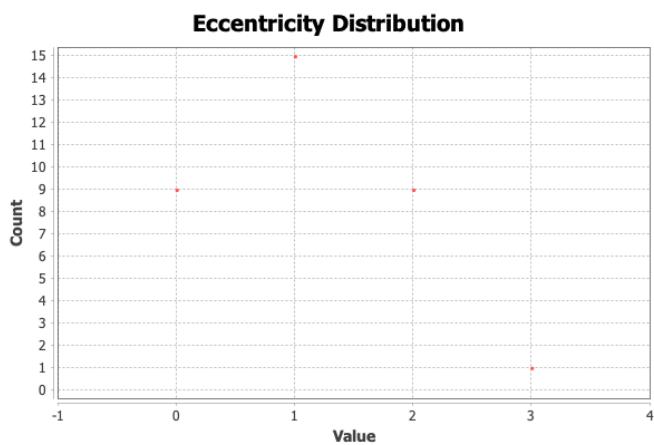
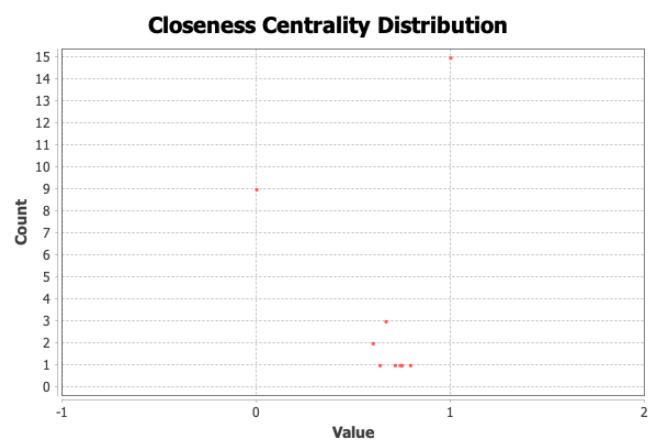
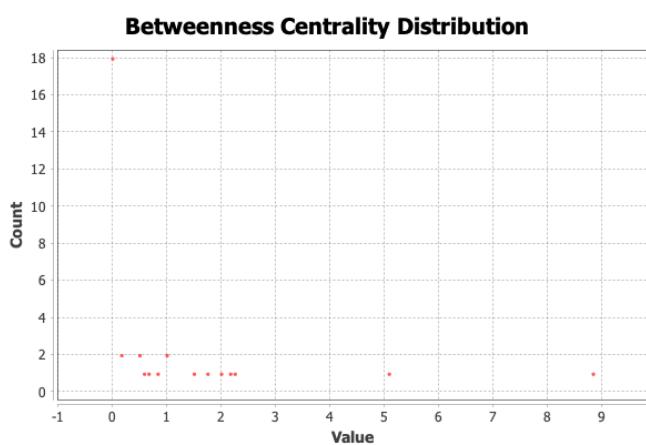
Network Interpretation: directed

### **Results:**

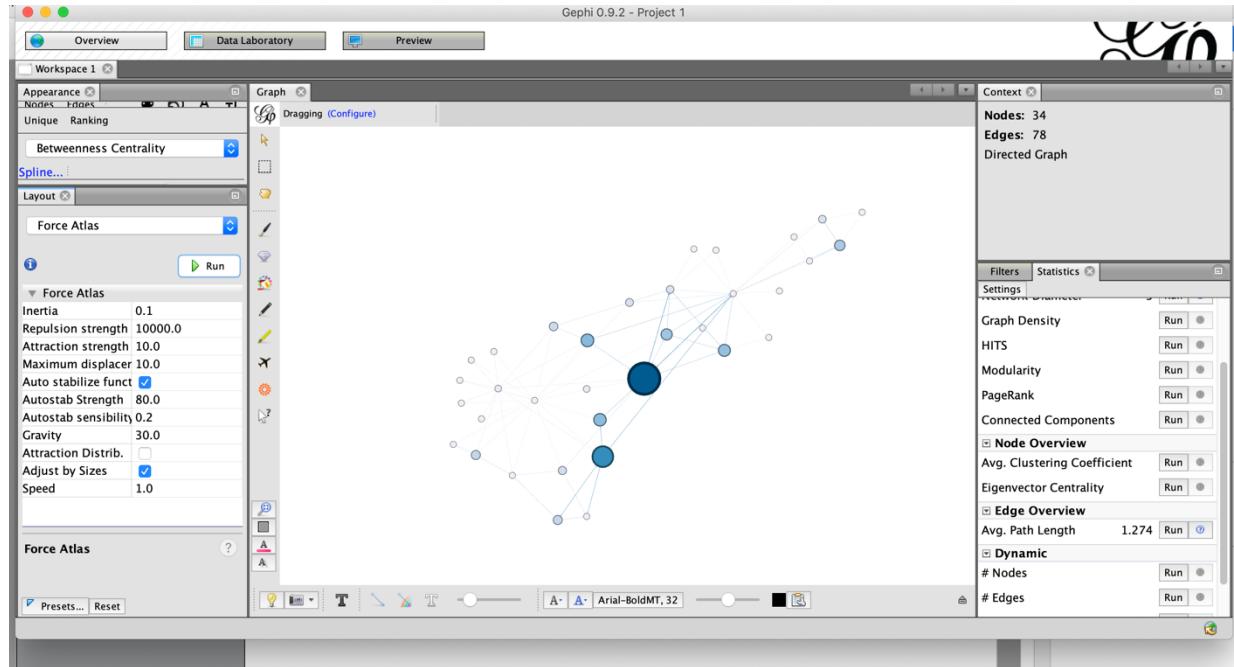
Diameter: 3

Radius: 0

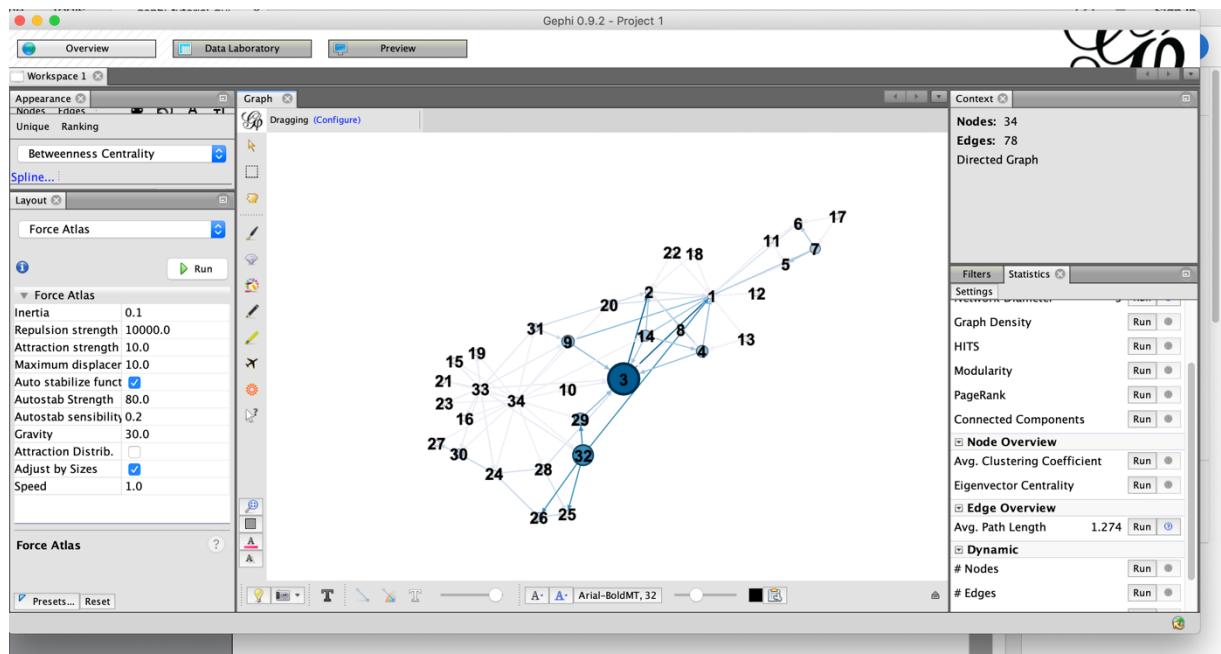
Average Path length: 1.2735849056603774



Changing in the Layout Size of the graph depends on (Betweenness Centrality metric):

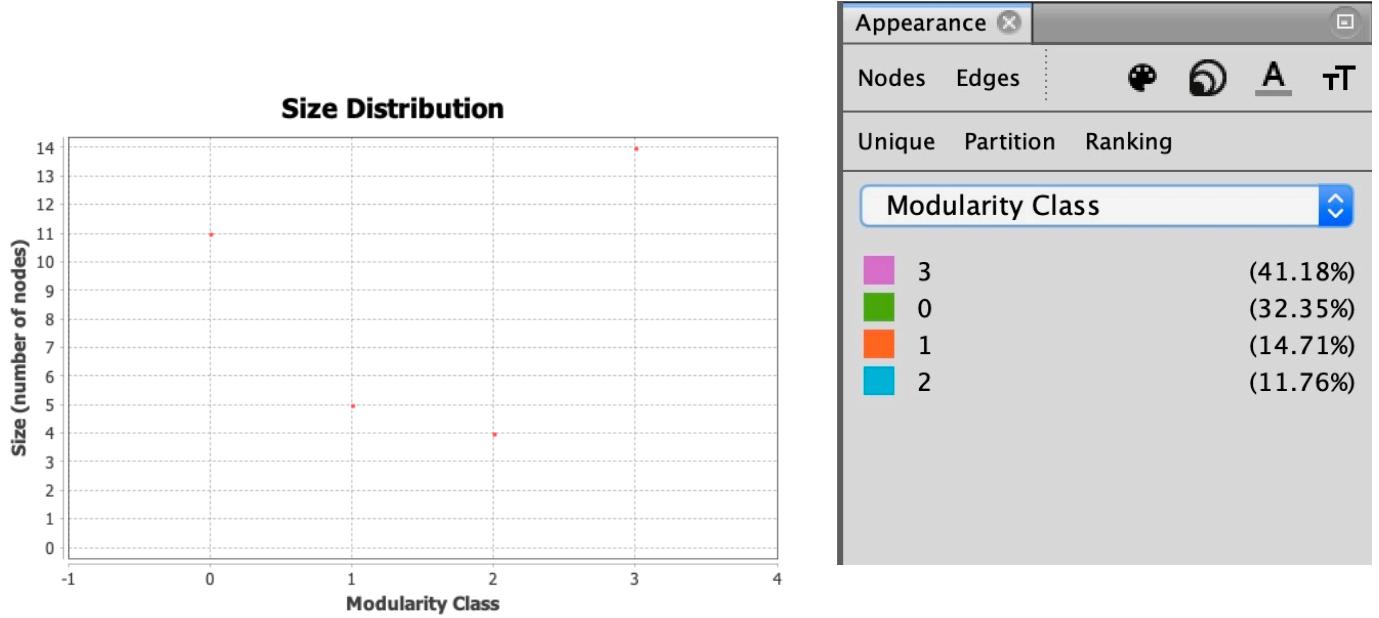


The network in more details:

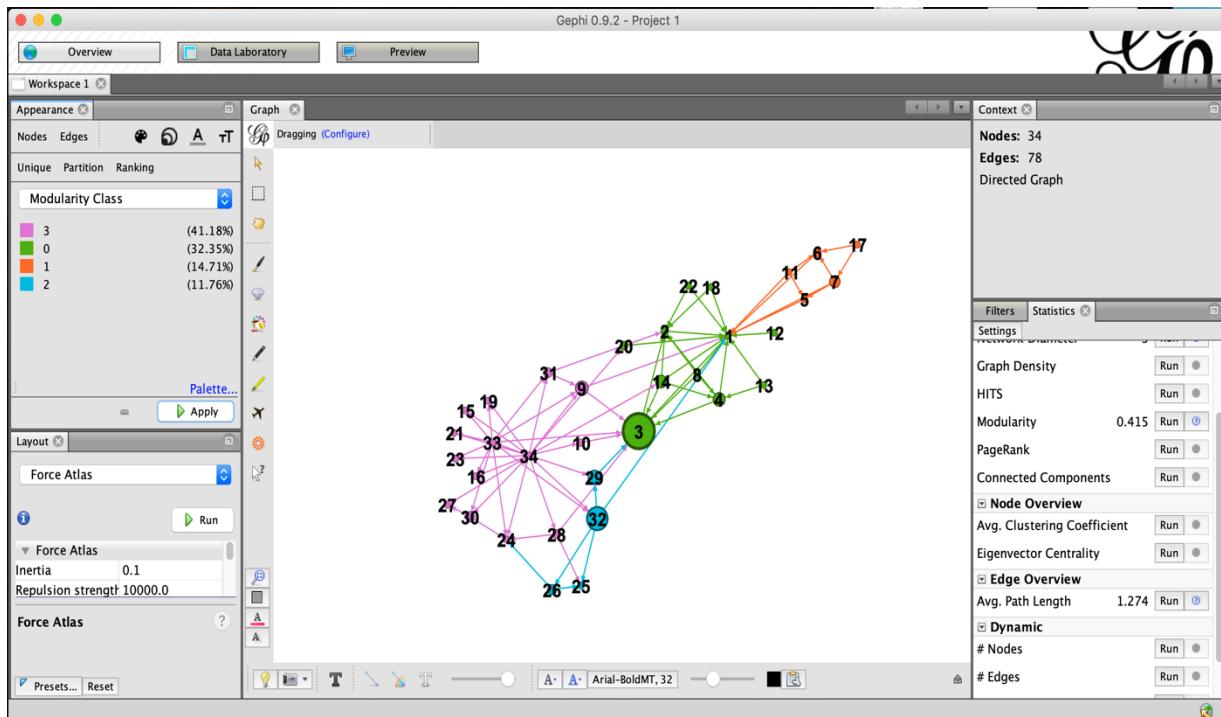


## Community detection (Modularity):

You can see that 4 communities were found. A random color has been set for each community identifier.



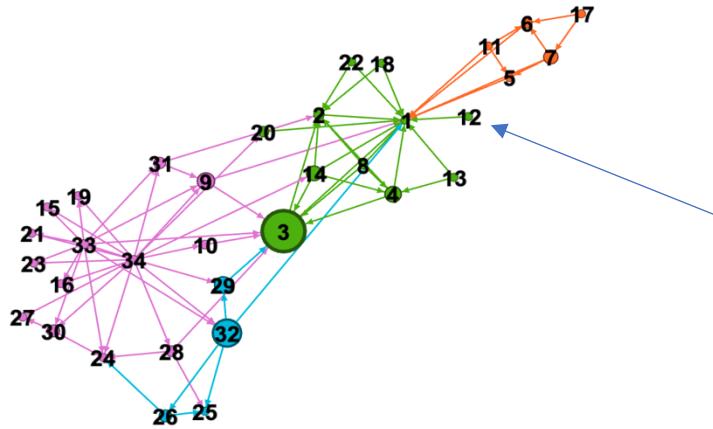
## The Partition:



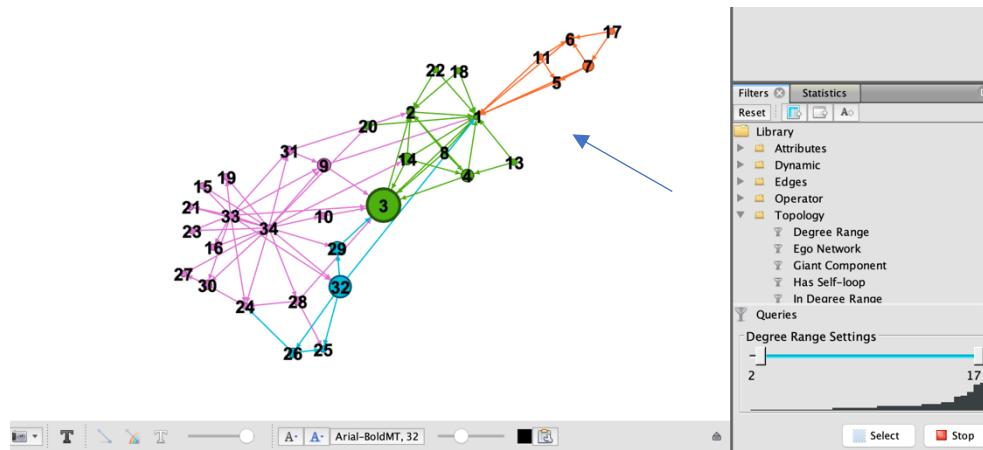
Filter:

Lower bound to 2

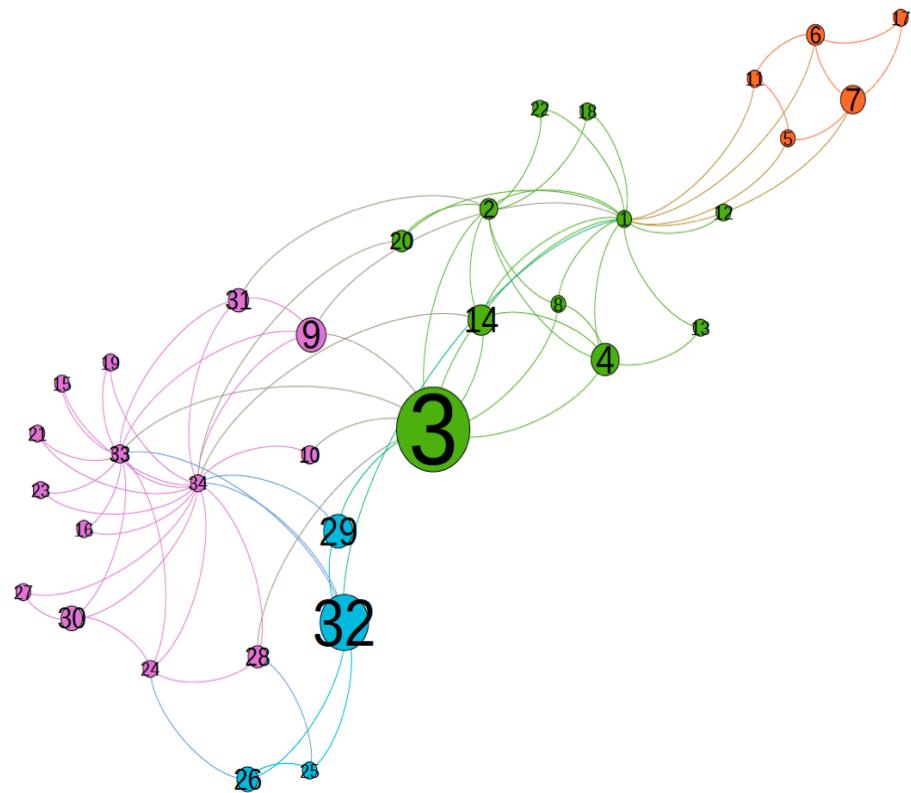
Before After The filtered network



The filtered network

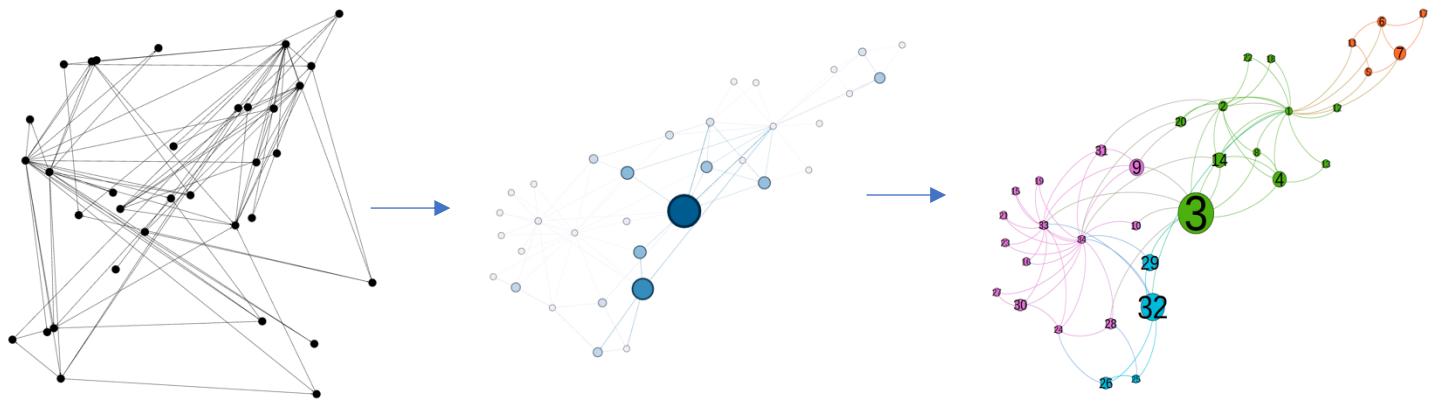


The Previewed Graph:



## Conclusion

In this assignment we learned the basic process to open, visualize, manipulate and render a network file with Gephi and how we use social network analysis tool to make sense of some social networking data.



## References

1. W. W. Zachary, An information flow model for conflict and fission in small groups, Journal of Anthropological Research 33, 452-473 (1977).
2. Zachary's karate club. <http://www1.ind.ku.dk/complexLearning/zachary1977.pdf>
3. Zachary's karate club.  
[https://ipfs.io/ipfs/QmXoypizjW3WknFiJnKLwHCnL72vedxjQkDDP1mXWo6uco/wiki/Zachary\\_Karate\\_Club.html](https://ipfs.io/ipfs/QmXoypizjW3WknFiJnKLwHCnL72vedxjQkDDP1mXWo6uco/wiki/Zachary_Karate_Club.html)